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Bibliography

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- (51) [The 5th edition of International Patent Classification]

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G05D 9/00       Z 7001-3H

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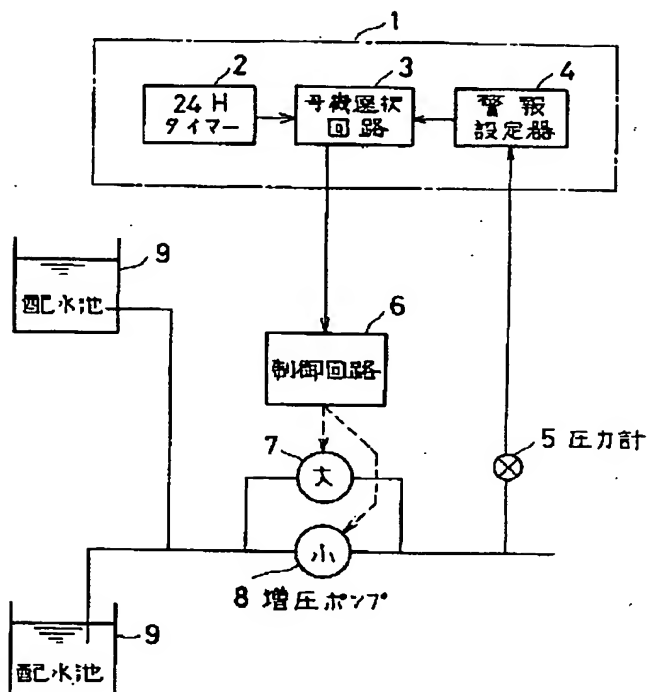
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(57) [Abstract]

[Elements of the Invention] This invention is the booster-pump control device equipped with the number machine selection circuitry which carries out comparison examination of the pressure signal from the pressure

gage which is installed in the discharge side of the juxtaposition water supply connection which consists of the 1st and 2nd booster pumps, and measures a water supply pressure, the 24-hour timer which sets up beforehand the operating system of the 1st and 2nd booster pumps per day, and this train operation dispatching from a 24-hour timer and a pressure gage, and chooses operation of the 1st or 2nd booster pump. [Effect] This invention enables it to aim at effective employment of the space supplying water.

[Translation done.]



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#### CLAIMS

[Claim(s)]

[Claim 1] The booster-pump control device characterized by providing the following The 1st booster pump which is installed in a water supply system water supply pumping station, and carries out the pressure up of the water supply pressure and which becomes capacity size the capacity which piping connection is made at this 1st booster pump and juxtaposition, and adjusts said water supply pressure -- smallness -- the 2nd booster pump The pressure gage which is installed in the discharge side of the juxtaposition water supply connection which consists of these 1st and 2nd booster pumps, and measures said water supply pressure The 24-hour timer which sets up beforehand the operation time of day of said 1st and 2nd booster pumps per day, The number machine selection circuitry which carries out comparison examination of train operation dispatching from a timer, and the pressure signal from said pressure gage for these 24 hours, and chooses operation of said 1st or 2nd booster pump, A change is performed on condition that the value of a pressure

gauge falls below to a setting pressure at the time of day switched to the 1st booster pump from the 2nd booster pump by the timer for these 24 hours. The number machine selection circuitry which performs a change at the time of day switched to the 1st booster pump from the 2nd booster pump on condition that the value of a pressure gauge rose more than the setting pressure, and the operation control circuit which controls operation of said 1st or 2nd booster pump with the operation signal from this number machine selection circuitry

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the booster-pump control device used for a water supply pumping station.

[0002]

[Description of the Prior Art] Conventionally, based on the need pattern beforehand set up in the booster pump of the water supply pumping station of a water supply system by the time zone on the 1st, the large and small pump installed in the water supply pumping station for 24 hours using the timer was switched, and it has corresponded to change of the amount of need.

[0003]

[Problem(s) to be Solved by the Invention] Since change of need did not change as a need pattern, depending on the amount of need at the time of a pump change-over, long duration and going up or falling extremely had \*\*\*\*\*,

[0004] This invention corresponds to the amount of need at the time of a change-over, and its water supply pressure fluctuation decreases as much as possible, and it carries out appearance control of the change of a size pump, and the timing. It aims at offering a booster-pump control device.

[0005]

[Means for Solving the Problem] The 1st booster pump which this invention is installed in a water supply system water supply pumping station, and carries out the pressure up of the water supply pressure and which becomes capacity size, the capacity which piping connection is made at this 1st booster pump and juxtaposition, and adjusts said water supply pressure -- smallness -- with the 2nd booster pump. The pressure gauge which is installed in the discharge side of the juxtaposition water supply connection which consists of these 1st and 2nd booster pumps, and measures a water supply pressure. The 24-hour timer which sets up beforehand the operation time of day of the 1st and 2nd booster pumps per day. The number machine selection circuitry which carries out comparison examination of train operation dispatching from a timer, and the pressure signal from a pressure gauge for these 24 hours, and chooses operation of the 1st or 2nd booster pump. A change is performed on condition that the value of a pressure gauge falls below to a setting pressure at the time of day switched to the 2nd booster pump from the 1st booster pump by the timer for 24 hours. At the time of day switched to the 1st booster pump from the 2nd booster pump. The value of a pressure gauge is the booster-pump control device which comes to provide the number machine selection circuitry which performs a change on condition that it went up more than the setting pressure, and the operation control circuit which controls operation of the 1st or 2nd booster pump by the operation signal from this number machine selection circuitry.

[0006]

[Function] In the booster-pump control device of this invention Install the 1st booster pump in a water supply

system water supply pumping station, and the pressure up of the water supply pressure is carried out. Make piping connection of the 2nd booster pump with the 1st booster pump at juxtaposition, and a water supply pressure is adjusted. Install a pressure gage in the discharge side of the juxtaposition water supply connection which consists of these 1st and 2nd booster pumps, and a water supply pressure is measured. The operating system of the 1st and 2nd booster pumps is beforehand set up per day for 24 hours using a timer. Comparison examination of train operation dispatching from a timer and the pressure signal from a pressure gage is carried out for 24 hours, operation of the 1st or 2nd booster pump is chosen, and operation of the 1st or 2nd booster pump is controlled by the operation signal from a number machine selection circuitry.

[0007]

[Example] Next, one example of this invention is explained. The 2nd booster pump which piping connection of the 1st booster pump 8 which 7 is installed in a water supply system water supply pumping station, and carries out the pressure up of the water supply pressure in drawing 1 is made with a booster pump 7 at juxtaposition, and adjusts a water supply pressure. The pressure gage which 5 is installed in the discharge side of the juxtaposition water supply connection which consists of booster pumps 7 and 8, and measures a water supply pressure. The 24-hour timer by which 2 sets up the operating system of booster pumps 7 and 8 beforehand per day, 3 carries out comparison examination of train operation dispatching from a timer 2, and the pressure signal from a pressure gage 5 for 24 hours. The capacity means for switching which the number machine selection circuitry which chooses operation of booster pumps 7 and 8, and 6 are operation control circuits which control operation of booster pumps 7 and 8 by the operation signal from the number machine selection circuitry 3, and switches pump capacity by the time amount planned beforehand. When it has a pressure detection means to detect a water supply pressure and this pressure detection means does not fulfill the conditions set up beforehand in the distribution-pump facility which is performing capacity change-over control by 24H timer with the control unit characterized by eliminating a capacity means for switching. With the output signal (contact) of the alarm set station 4 which installs the pressure gage 5 which measures a water supply pressure, and detects alarm \*\*\*\* from the analog signal of a pressure gage 5, at the time of a water supply pressure buildup a pump facility is controlled to control a water supply flow rate, and conversely, at the time of a water supply pressure drop, a pump facility is operated so that a water supply flow rate may be made to increase. By seasoning the capacity change-over control by 24H timer with water supply pressure control, the abrupt change of a water supply pressure is stopped and stable water supply is performed.

[0008] That is, in this water supply pumping station, by 24H timer 2, the mass booster pump 7 and the booster pump 7 of small capacity are switched, and operation according to need is performed. This is shown in drawing 2.

[0009] When need increases and it switches to a booster pump from a booster pump based on the signal of 24H timer 2, \*\*\*\*\* is measured in a pressure gage 5, and operation with a small pump is continued until the signal of a pressure drop is taken out from an alarm set station 4.

[0010] When need falls and it switches to a small pump from a large pump, operation with a large pump is continued until a pressure buildup arises by the decrease of need.

[0011] Next, it can also use for the control of number of units of two or more sets of the booster pumps which consist of this capacity as other examples.

[0012] That is, when need increases and it switches from one booster pump to two sets of operations based on the signal of 24H timer, in a pressure gage, \*\*\*\*\* is measured, and operation with one pump is continued until the signal of a pressure drop is taken out from an alarm set station.

[0013]

[Effect of the Invention] Extreme fluctuation of a water supply pressure can be suppressed by this invention to the minimum, leakage of water, the crack of piping, and breakage can be prevented, the need fluctuation which does not suit a need pattern can be absorbed and lack of water supply by water pressure fall can be prevented.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the block diagram of the movement control unit in which one example of this invention is shown.

[Drawing 2] It is the explanatory view showing the property of drawing 1 .

[Description of Notations]

2--24-hour timer

3 -- Number machine selection circuitry

5 -- Pressure gage

7 8 -- Booster pump

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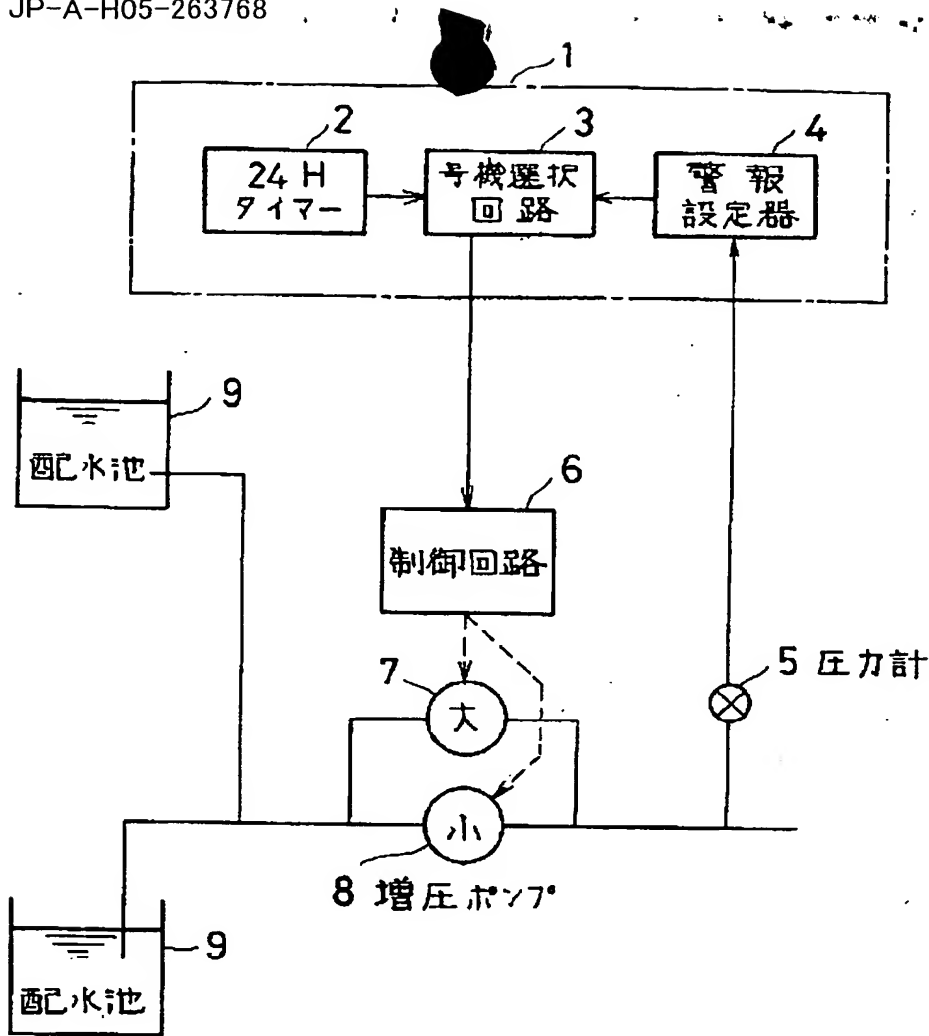
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## DRAWINGS

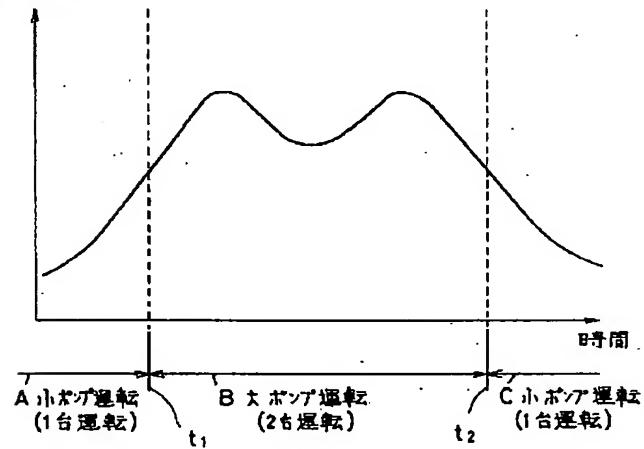
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[Drawing 1]



[Drawing 2]

荷重量



[Translation done.]

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G 0 5 B 11/18		D 7740-3H		
19/02	F	7361-3H		
G 0 5 D 9/00	Z	7001-3H		

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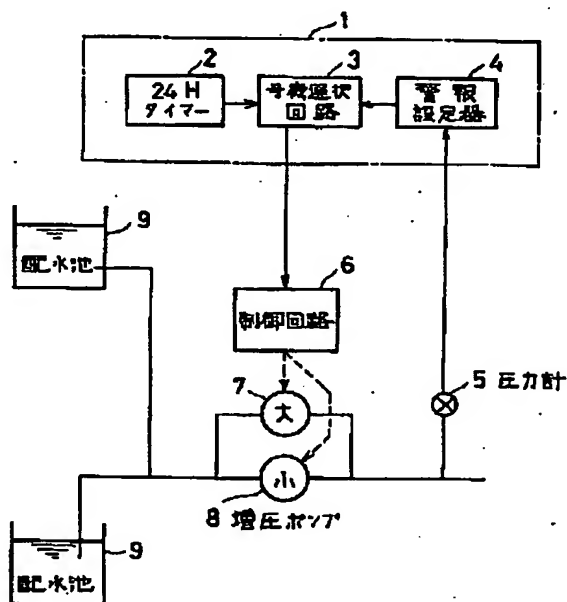
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(54) 【発明の名称】 増圧ポンプ運転制御装置

(57) 【要約】

【構成】 本発明は、第1および第2の増圧ポンプからなる並列配水接続の吐出側に設置されて配水圧力を測定する圧力計と、第1および第2の増圧ポンプの運転方式を一口単位で予め設定する24時間タイマーと、この24時間タイマーからの運転指令と圧力計からの圧力信号とを比較検討し、第1または第2の増圧ポンプの運転を選択する号機選択回路とを備えた増圧ポンプ運転制御装置である。

【効果】 本発明により、配水場の効果的な運用を図ることが可能となる。



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## 【特許請求の範囲】

【請求項1】 上水道配水ポンプ場に設置されて配水圧力を昇圧する容量大なる第1の増圧ポンプと、この第1の増圧ポンプと並列に配管接続されて前配配水圧力を加減する容量小なる第2の増圧ポンプと、これら第1および第2の増圧ポンプからなる並列配水接続の吐出側に設置されて前配配水圧力を測定する圧力計と、前記第1および第2の増圧ポンプの運転時刻を一日単位で予め設定する24時間タイマーと、この24時間タイマーからの運転指令と前記圧力計からの圧力信号とを比較検討し、前記第1または第2の増圧ポンプの運転を選択する号機選択回路と、この24時間タイマーにより第1の増圧ポンプから第2の増圧ポンプに切換える時刻では圧力計の値が設定圧力以下に低下することを条件に切換えを実行し、第2の増圧ポンプから第1の増圧ポンプに切換える時刻では、圧力計の値が設定圧力以上に上昇したことを条件に切換えを実行させる号機選択回路と、この号機選択回路からの運転信号によって前記第1または第2の増圧ポンプの運転を制御する運転制御回路と、を具備してなる増圧ポンプ運転制御装置。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】 本発明は、配水ポンプ場に用いられる増圧ポンプ運転制御装置に関する。

## 【0002】

【従来の技術】 従来、上水道の配水ポンプ場の増圧ポンプにおいては1日の時間帯により予め設定された需要パターンに基づき、24時間タイマーを用いて、配水ポンプ場に設置された大小のポンプを切換えて需要量の変化に対応してきた。

## 【0003】

【発明が解決しようとする課題】 需要の変化は需要パターンどおりには推移しないため、ポンプ切換時の需要量によっては、配水圧が長時間、極端に上昇、あるいは低下することがあった。

【0004】 本発明は、切換時の需要量に対応し、大小ポンプの切換え、タイミングを配水圧変動が極力少なくなる様制御する。増圧ポンプ運転制御装置を提供することを目的とする。

## 【0005】

【課題を解決するための手段】 本発明は、上水道配水ポンプ場に設置されて配水圧力を昇圧する容量大なる第1の増圧ポンプと、この第1の増圧ポンプと並列に配管接続されて前配配水圧力を加減する容量小なる第2の増圧ポンプと、これら第1および第2の増圧ポンプからなる並列配水接続の吐出側に設置されて配水圧力を測定する圧力計と、第1および第2の増圧ポンプの運転時刻を一日単位で予め設定する24時間タイマーと、この24時間タイマーからの運転指令と圧力計からの圧力信号とを比較検討し、第1または第2の増圧ポンプの運転を選択

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する号機選択回路と、24時間タイマーにより第1の増圧ポンプから第2の増圧ポンプに切換える時刻では圧力計の値が設定圧力以下に低下することを条件に切換えを実行し、第2の増圧ポンプから第1の増圧ポンプに切換える時刻では、圧力計の値が設定圧力以上に上昇したことを条件に切換えを実行させる号機選択回路と、この号機選択回路からの運転信号によって第1または第2の増圧ポンプの運転を制御する運転制御回路と、を具備してなる増圧ポンプ運転制御装置である。

## 10 【0006】

【作用】 本発明の増圧ポンプ運転制御装置においては、上水道配水ポンプ場に第1の増圧ポンプを設置して配水圧力を昇圧し、第1の増圧ポンプと並列に第2の増圧ポンプを配管接続して配水圧力を加減し、これら第1および第2の増圧ポンプからなる並列配水接続の吐出側に圧力計を設置して配水圧力を測定し、第1および第2の増圧ポンプの運転方式を24時間タイマーを用いて一日単位で予め設定し、24時間タイマーからの運転指令と圧力計からの圧力信号とを比較検討し、第1または第2の増圧ポンプの運転を選択し、号機選択回路からの運転信号によって第1または第2の増圧ポンプの運転を制御する。

## 【0007】

【実施例】 次に本発明の一実施例を説明する。図1において、7は上水道配水ポンプ場に設置されて配水圧力を昇圧する第1の増圧ポンプ8は増圧ポンプ7と並列に配管接続されて配水圧力を加減する第2の増圧ポンプ、5は増圧ポンプ7、8からなる並列配水接続の吐出側に設置されて配水圧力を測定する圧力計、2は増圧ポンプ7、8の運転方式を一日単位で予め設定する24時間タイマー、3は24時間タイマー2からの運転指令と圧力計5からの圧力信号とを比較検討し、増圧ポンプ7、8の運転を選択する号機選択回路、6は号機選択回路3からの運転信号によって増圧ポンプ7、8の運転を制御する運転制御回路であり、予め予定された時間でポンプ容量を切換える容量切換手段と、配水圧力を検出する圧力検出手段とを持ち、この圧力検出手段が予め設定された条件を満たさない時は、容量切換手段を消去することを特徴とする制御装置で、24Hタイマによる容量切換制御を行なっている配水ポンプ設備において、配水圧力を計測する圧力計5を設置し、圧力計5のアナログ信号から警報設点を検出する警報設定器4の出力信号（接点）により、配水圧力上昇時は、配水流量を抑制するようにポンプ設備を制御し、逆に、配水圧力低下時は配水流量を増加させるようにポンプ設備を運転する。24Hタイマーによる容量切換制御に配水圧力制御を加味することで、配水圧力の急激な変化を抑え、安定した配水を行う。

【0008】 即ち、この配水ポンプ場において24Hタイマー2により、大容量の増圧ポンプ7と小容量の増圧



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ポンプ7を切換えて需要に応じた運転を行なう。これを図2に示す。

【0009】需要が高まり24Hタイマー2の信号に基づき増圧ポンプから増圧ポンプに切換える時、圧力計5において配水圧を測定し、警報設定器4より圧力低下の信号が出されるまでは小ポンプによる運転を続ける。

【0010】需要が下がり、大ポンプから小ポンプに切換える時、需要減により圧力上昇が生じるまでは大ポンプによる運転を続ける。

【0011】次に他の実施例として同容量からなる複数10 台の増圧ポンプの台数制御に用いることもできる。

【0012】即ち、需要が高まり、24Hタイマーの信号に基づき増圧ポンプ1台から2台の運転に切換える時、圧力計において、配水圧を測定し、警報設定器より圧力低下の信号が出されるまではポンプ1台による運転

を続けるのである。

【0013】

【発明の効果】本発明により配水圧力の極端な変動を最小限に抑え、漏水、配管の亀裂、破損を防ぐことができ、需要パターンに合わない需要変動を吸収し、水圧低下による給水の不足を防ぐことができる。

【図面の簡単な説明】

【図1】本発明の一実施例を示す運動制御装置の構成図である。

【図2】図1の特性を示す説明図である。

【符号の説明】

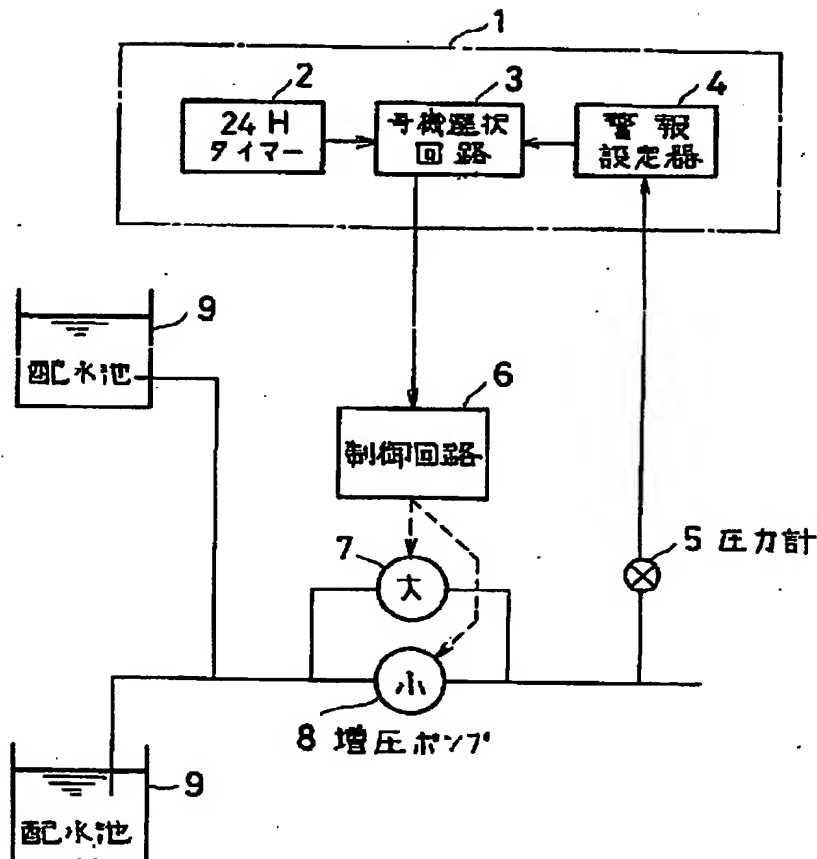
2…24時間タイマー

3…号機選択回路

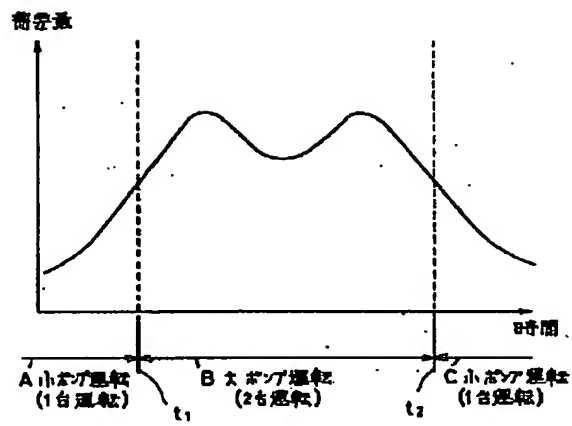
5…圧力計

7、8…増圧ポンプ

【図1】



【図2】



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